THE ENERGY TRACKER

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ABSTRACT

Since 1978, Houston Lighting & Power Company has been concerned with promoting the efficient use of energy. The guiding concept to the creation of conservation programs is the underlying responsibility to respond to the needs of our customers, employees, shareholders, and the communities we serve.

One such need was observed during our commercial and industrial audits. This need was for an effective energy tracking system.

Although there are other products available which track energy use, the Energy Tracker has unique features which make it particularly useful. These features are as follows:

1. It is a multi-function program combining a tracking chart, data base, and graphing capabilities.
2. It is menu-driven, making it extremely easy to use.
3. It is extremely flexible allowing individual customer needs to be met.

Houston Lighting & Power Company has been successful in meeting the electrical needs of its reviews its plans for meeting the electric demands of the area it serves. Since a multitude of trends and conditions affect supply decisions, today's power sources may not be viable tomorrow. Through the development and implementation of various energy conservation programs, HL&P can continue to monitor and adjust to the fluctuating sensitivities of its surrounding economy.

The Conservation Activities Department was formed in 1978 to address a number of issues HL&P was facing. Currently, in promoting the efficient use of electricity, HL&P accomplishes two main objectives. First, it holds down the growth in peak demand. Secondly, the Company responds to customers' concerns over the rising cost of energy by offering assistance and advice on how to avoid wasting energy and thus hold down electric bills.

HL&P accomplishes these objectives through sophisticated customer outreach and incentive programs. Rebate programs motiviate residential customers to retrofit their homes through weatherization measures and high efficiency heating and cooling equipment. Residential, commercial, and industrial customers can have their homes, office buildings, schools, work locations, and industrial facilities audited and low cost/no cost recommendations made on how to use energy wisely. Seminars are held for various classes of commercial customers (schools, churches, restaurants,office buildings, etc.) to inform them about energy saving measures. A recent addition to

so has the scope and complexity of HL&P's planning efforts to allow the Company to respond to fluctuating conditions.

The Company provides electricity to more than three million people in the 5000 square mile service area, an area roughly 50 miles around the city of Houston. HL&P's service area covers only 2% of Texas land area, but serves approximately 21% of the state's population and produces 31% of all the electricity used in Texas. These facts alone begin to reveal that the challenge the Company faces is unique.

Overall, the outlook for Houston is bright as the city moves from the recession of the early 1980's. Houston continues to be very attractive for new business locations, expansions, and start-ups due to ample labor, low taxes and an aggressive policy towards economic development. Steady, rather than "boom time" growth will continue to occur unless some unexpected event causes the oil industry to boom again.

In recognizing the need to remain flexible in a rapidly changing environment, HL&P continually

Through HL&P's commercial and industrial conservation programs it was observed that, surprisingly, many commercial and industrial customers did not have an effective energy tracking system. Furthermore, those facilities which did have such a system were much more likely to implement conservation recommendations and improve their overall energy use efficiency.

To address this situation, HL&P's Commercial and Industrial Conservation personnel embarked on the development of a computer-based energy tracking system which could readily be made available to all interested industrial and commercial customers.

Initial design parameters for the system were established after consultation with various customers to determine exactly what they felt was needed. These are listed as follows:

1. The system must operate on a personal computer.
2. Ease-of-use should be emphasized and data entry should not be overly burdensome.
3. The system should have the ability to track various fuel usage rates, costs, and an

Proceedings of the Second Symposium on Improving Building Systems in Hot and Humid Climates, College Station, TX, September 24-26, 1985

energy use index, e.g. Btu per pound product or Btu per square foot.

4. Data should be displayed in a clear and concise manner.

5. If possible, graphics should be used to more effectively communicate key results.

6. The system should have the capability of comparing present facility energy performance to previous year performance.

7. Data and graphs produced should be suitable for direct distribution to facility personnel.

The design process was then initiated to come up with a satisfactory tracking system which would satisfy this rather ambitious list of design parameters. It was quickly discovered that the Lotus 1-2-3 programming package could be very effectively utilized to construct the tracking system.

The product that was developed is called "The Energy Tracker" and consists of three basic components:

1. Tracking Chart
2. Display or graphs
3. Data base

Each of these components is displayed in the following figures. The tracking chart is basically a spreadsheet consisting of 13 columns of energy use data and 13 rows which define the time period. Considerable flexibility is inherent in the design of the chart, allowing manipulation of rows and columns to meet specific customer requests. The system has the capability to produce up to 30 different graphs which plot data displayed in the tracking chart. These graphs are automatically plotted by making appropriate main program menu selections. Historical data can also be plotted. The data base stores three or more years of previous energy use data and enables comparison of present facility energy performance with historical performance.

The complete program is stored on a floppy diskette and operates on an IBM personal computer using Lotus 1-2-3 software. Future plans call for converting the system for operation on the Apple IIe computer and CPM-based machines. The tracking chart and all graphs will fit on 8½" x 11" paper allowing direct distribution. One other very important feature is that the complete system is menu-driven, making it very easy for computer novices to operate and use the system in a matter of minutes.

"The Energy Tracker" is available to all of HL&P's industrial and commercial customers, as well as other interested utilities, free of charge. A version is available for commercial customers which tracks 3 years of energy data. An industrial version is available for industrial customers to track 15 years of energy data. Requests for the system have been received from a wide variety of customer types, some of which are listed as follows:

1. Office Buildings
2. School districts
3. Hospitals
4. Retail stores
5. Large chemical complexes
6. Industrial gas manufacturer
7. Refineries
8. Utilities
9. Texas Public Utility Commission

Direct energy savings cannot be quantified. However, it has unquestionably influenced large savings. An effective energy tracking system is paramount to the success of an overall facility energy management program. Through surveys we have found that customers who lack such a system typically demonstrate little improvement in overall energy use efficiency over time. Those customers who have effective systems in place show consistent efficiency improvement. When facility decision makers receive proper feedback on energy use, progress usually results.

The tracking system also allows quick detection of transient energy efficiency problems (both electric and gas) and the monitoring of conservation progress. The setting of energy efficiency goals and the measuring of progress toward those goals, another key component of a successful energy management program, is also made easier through the use of the tracking system.

As can best be determined, Houston Lighting & Power is the first utility to offer such a product to its customers. A copyright for the computer programs have been obtained.

The customer's behavior toward conservation can be strongly affected by an energy tracking system. Sustained energy efficiency improvement is very unlikely to take place unless the customer knows how much energy he is using and how much is being saved as a result of conservation actions. The tracking system is critical to the overall energy management process.

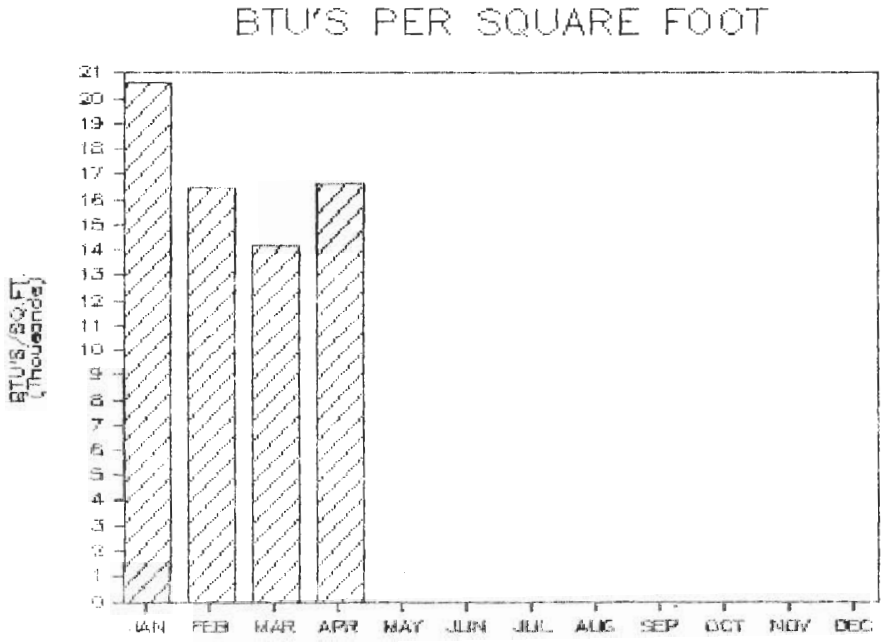
ENERGY TRACKING CHART

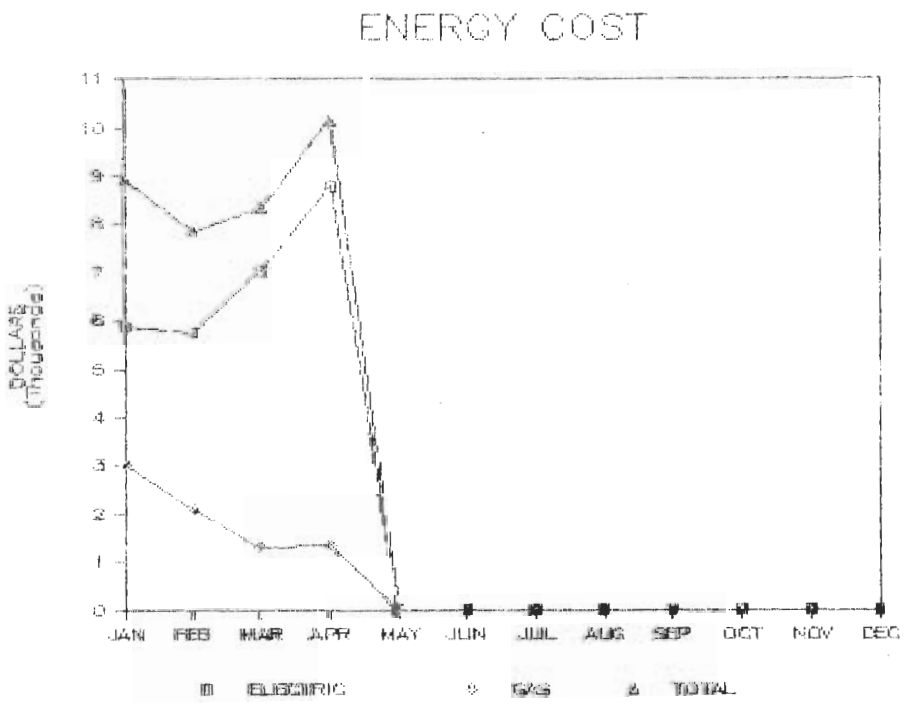
YEAR 1984

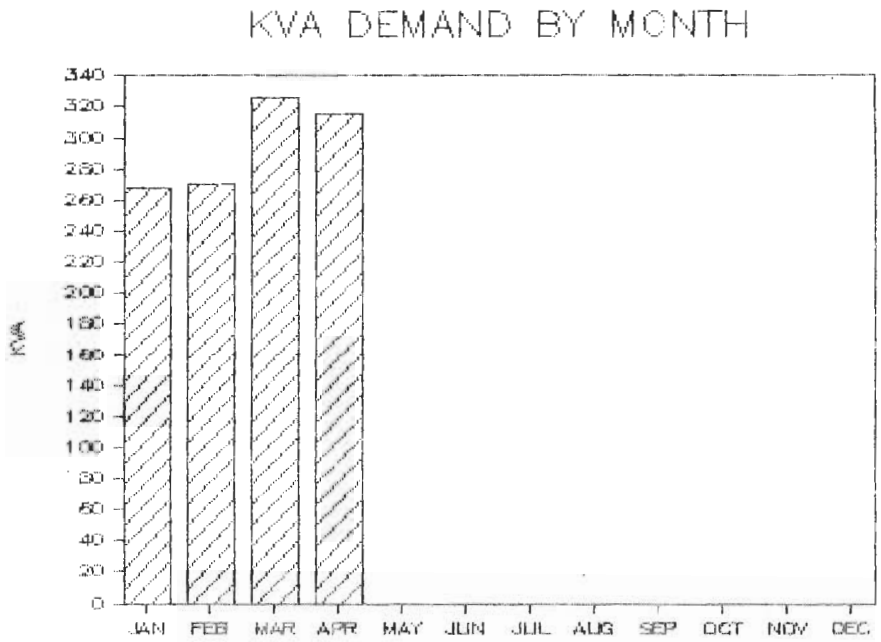
GROSS CONDITIONED SQUARE FEET: 42000

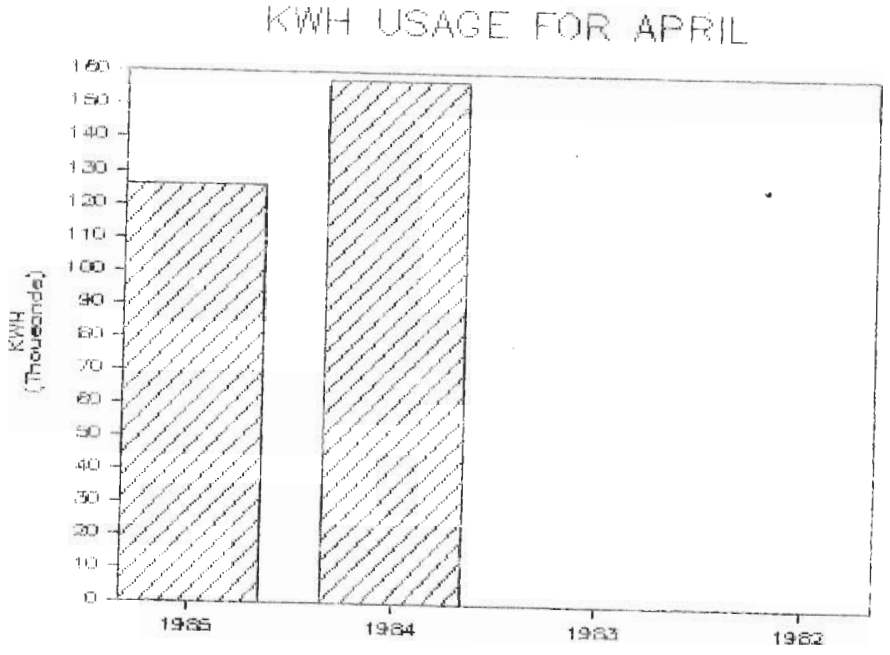
Month	ELECTRICITY				NATURAL GAS			TOTAL ENERGY			% Diff. Prev. Yr.	
	KWH USED	KVA DEMAND	MILLION BTU'S (KWH*.003413)	COST	MCF	MILLION BTU'S (MCF*1.03)	COST	MILLION BTU'S	TOTAL COST	BTU'S/ SQ.FT.	ELEC-TRICITY	GAS
JAN.	154560	333	527.51328	9605	1086	1118.58	6189	1646.093	15794	39192.69	ERR	ERR
FEB.	135264	328	461.656032	8271	807	831.21	4652	1292.866	12923	30782.52	ERR	ERR
MARCH	133636	340	456.099668	8561	584	601.52	3356	1057.619	11917	25181.42	ERR	ERR
APRIL	157872	370	538.817136	10172	479	493.37	2748	1032.187	12920	24575.88	ERR	ERR
MAY	165072	400	563.390736	10695	321	330.63	1818	894.0207	12513	21286.20	ERR	ERR
JUNE	187898	447	641.295874	12130	302	311.06	1710	952.3558	13840	22675.13	ERR	ERR
JULY	211680	437	722.46384	10329	291	299.73	1631	1022.193	11960	24337.94	ERR	ERR
AUG.	184176	405	628.592688	11734	284	292.52	1561	921.1126	13295	21931.25	ERR	ERR
SEPT.	171312	420	584.687856	11121	292	300.76	1574	885.4478	12695	21082.09	ERR	ERR
OCT.	151152	356	515.861776	9517	311	320.33	1683	836.2117	11200	19909.80	-11.8174	-19.4300
NOV.	120000	360	409.56	7878	354	364.62	1927	774.18	9805	18432.85	-26.6862	-44.3396
DEC.	121008	347	413.000304	7879	352	362.56	1917	775.5603	9796	18465.72	-9.34915	-58.1947
YEAR TO DATE	1893630	4543	6462.95919	117892	5463	5626.89	30766	12089.84	148658	287853.5	304.1244	193.0793

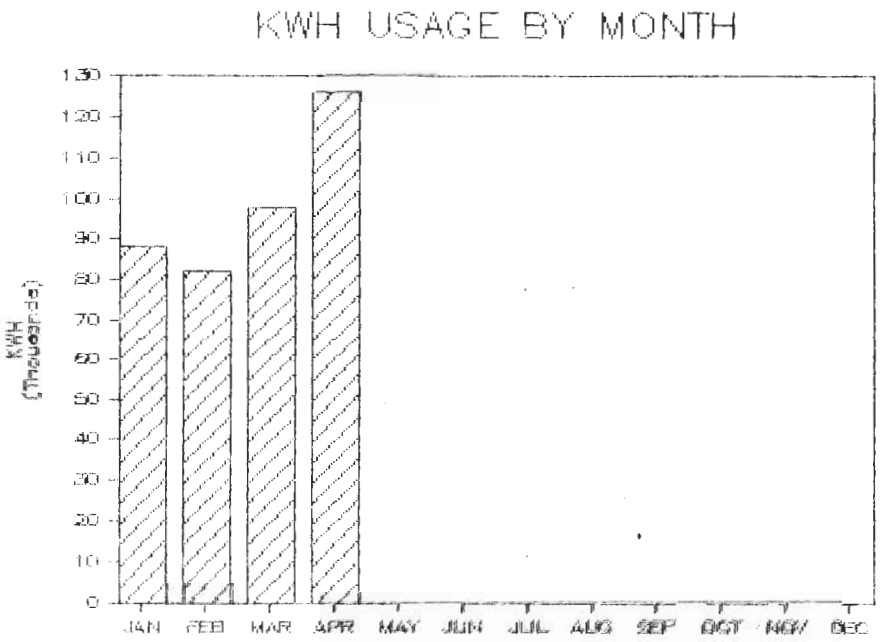
YEAR TO DATE COST PER SQUARE FOOT 3.5394761905

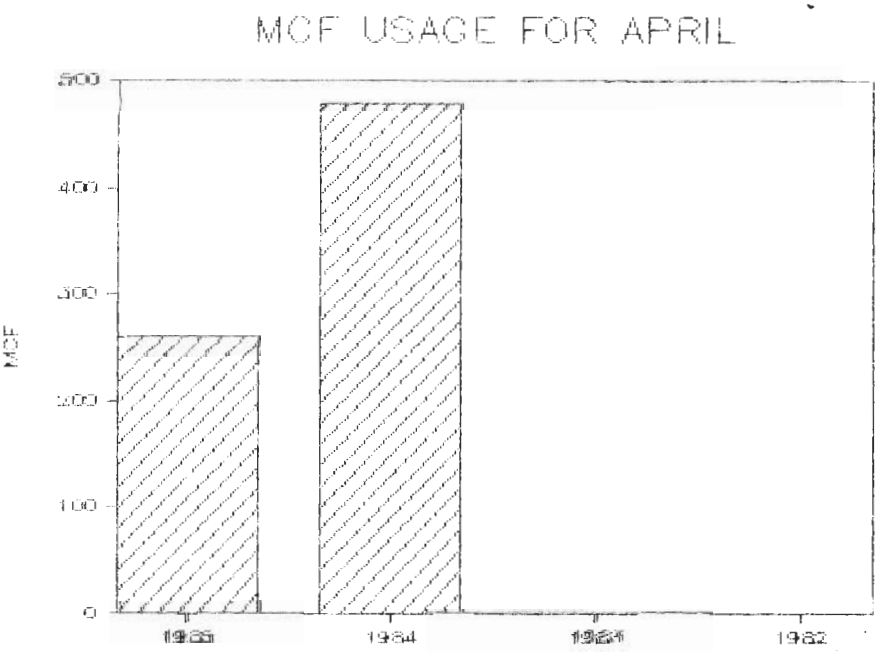

BTU'S PER SQUARE FOOT
BTU'S/SQ.FT.
(Thousands)
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC


ENERGY COST
DOLLARS
(Thousands)
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
ELECTRIC
GAS
TOTAL


KVA DEMAND BY MONTH
KVA
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC


KWH USAGE FOR APRIL
KWH (Thousands)
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
1985
1984
1983
1982


KWH USAGE BY MONTH
KWH (Thousands)
130
120
110
100
90
80
70
60
50
40
30
20
10
0
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC


MCF USAGE FOR APRIL
MCF
500
400
300
200
100
0
1983
1984
1982